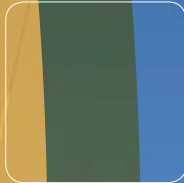




Welded Carbon Steel Pipe

FOR WATER BORE AND GENERAL DRILLING APPLICATIONS

PRODUCT CATALOGUE



Water Bore Casing
to Australian Standard
AS 1396

General Drilling Casing
in Accordance with
J.55 Grade and API 5L
for oil, gas and
geotechnical drilling



Giving Steel A Real Edge.



Manufacturing

Leak tightness shall be in accordance with AS1396 with diameters up to and including 168.3mm OD using on line eddy current testing and diameters 178mm OD and above, hydrostatically pressure tested.

A water based black acrylic primer with nominal 20 micron coating is applied to the external surface using Orrcon's Smartcote technology. Paint gloss level is a satin finish, which can be readily welded or stripped for hot dip galvanising.

The internal weld bead will be roll flattened or scarfed up to 168.3mm OD and scarfed flush for sizes 177.8mm and above. The external weld bead is scarfed flush with the outer surface of the pipe for all diameters.

Standard end finish is an A.P.I. 30 degree bevelled end in accordance with AS1396 and A.P.I. 5L.

The standard stock lengths available are 6 or 12 metres, with non standard lengths available off rollings subject to enquiry.



Orrcon OrrBore is designed for the bore drilling industry and manufactured to meet the industry standard AS1396 for water bore drilling.

Bore casing to other standards including A.P.I. 5L are available for geological and oil and gas drilling. OrrBore is coated on the external surface only to provide reasonable weathering protection when stored outside. External storage beyond 6 months is likely to cause surface rusting and gradual deterioration.

OrrBore can be used in the "as supplied" bevelled end condition by butt welding pipe lengths together when being installed in the field.

Alternatively, Orrcon offers a range of threaded or expanded end options to minimise or simplify field activities.

Pipe sizes available cover the range normally used by the drilling industry from 101.6mm OD up to 610mm OD, with some uncommon sizes also included. A variety of wall thicknesses is available for each diameter.

All pipe is made from steel grades achieving a minimum 350 MPa yield strength for the finished pipe. Higher grades of steel pipe are available subject to enquiry, including J55 grade.

Orrcon OrrBore is another quality "industry specialised" product from Orrcon.

AS1396 Bore Casing Pipe

A hybrid Australian Standard developed to improve the quality of material used in down hole water bores. Created to meet local manufacturer's capabilities, it is a mixture of AS1163 C350 and A.P.I. 5LX 42 specification requirements. Specifically the pipe is to A.P.I. dimensions, has bevelled ends, a minimum 350 MPa yield when tested unaged as longitudinal samples. The standard does not call for internal weld bead removal, although most end users now ask for this to avoid fouling drill tips during installation.

Manufacturing tolerances – applicable to OrrBore Bore Casing Pipe.

Wall thickness – Minimum thickness not less than 90% of nominal wall thickness.

Mass – -3.5% to +10% on nominal weight for any given length.

Straightness – Deviation from a straight line for stock length equals 0.2% maximum deviation over a given length.

Length – For pipes up to 168.3mm OD. Standard stock length tolerance is +50mm – 0mm on nominal length supplied. For pipes 177.8mm OD and above. Standard stock length tolerance is +200mm – 0mm "off mill" on nominal length supplied. Special cut lengths are available subject to enquiry, but may incur a surcharge.

Diameter – maximum variation from nominal outside diameter – for all wall thicknesses.

Nominal Diameter	DN.	100	125 TUBE	125A.S.	125A.P.I.	150A.S.	150A.P.I.	178A.P.I.	193A.P.I.	200A.P.I.
Outside Diameter	Inches	4	5	5	5	6	6	7	7 7/8	8
Tolerance on O.D.	mm	114.3	127.0	139.7	141.1	165.1	168.3	177.8	193.1	219.1
	mm	±	±	±	±	±	±	±	±	±

Mechanical Properties AS1396	Minimum Longitudinal Yield Strength	Minimum Transverse Yield Strength	Minimum Tensile Strength	Minimum Elongation as a Proportion of Gauge Length
100NB to 150NB all wall thicknesses	380	N/A	450	20%
178mm to 610mm 7 inch to 24 inch	350	N/A	430	20%

Sizes Available Water Bore Casing To AS1396

Outside Diameter	Wall Thickness	Mass KG/M	Metres per tonne
101.6	4.8mm	11.5	87.0
	6.0mm	14.15	70.7
114.3	4.8mm	12.96	77.2
	5.4mm	14.5	69.0
	6.0mm	16.02	62.4
127.0	4.8mm	12.96	77.2
	5.4mm	16.2	61.7
	6.0mm	17.9	55.9
139.7	4.8mm	16.0	62.5
	5.4mm	17.9	55.9
	6.0mm	20.7	48.2
141.3	4.8mm	16.16	61.9
	5.6mm	18.74	53.4
	6.4mm	21.29	46.9
168.3	4.8mm	19.35	51.7
	6.4mm	25.55	39.1
	7.1mm	28.22	35.4
177.8	4.8mm	20.48	48.8
	6.4mm	27.06	36.95
	8.2mm	34.30	29.2
193.1	6.4mm	29.47	33.9
	8.2mm	37.38	26.8
219.1	6.4mm	33.57	29.8
	8.2mm	42.65	23.4
273.1	6.4mm	42.09	23.08
	9.3mm	60.5	16.5
323.9	6.4mm	50.11	20.0
	9.5mm	73.65	13.6
355.6	6.4mm	55.11	18.1
	9.5mm	81.08	12.3
406.4	6.4mm	63.13	15.8
	9.5mm	92.98	10.8
457.0	6.4mm	71.12	14.1
	9.5mm	104.84	9.54
508.0	6.4mm	79.16	12.6
	9.5mm	116.78	8.56
610.0	6.4mm	95.26	10.5
	9.5mm	140.68	7.11

Stock Lengths

6 metre bevelled end is standard pipe with 12 metre stock lengths also available. Other lengths are available ex rollings subject to enquiry.

Tensile Properties

All of the above sizes are offered as per Australian Standard AS1396 – minimum yield strength 350 MPa – minimum tensile strength 450 MPa. Casing of higher grade steels equivalent to J55 grade are available ex rollings subject to enquiry.

General Data – Casing, Tubing and Drill Pipe Tensile Requirements To International Grades

Grade	Yield Strength				Tensile Strength		
	Min P.S.I.	MPa	Max P.S.I.	MPa	Min P.S.I.	MPa	
Casing 4 ^{1/2} inch and larger (114.3mm and larger)	H-40	40,000	275	-	-	60,000	415
	J-55	55,000	380	80,000	552	75,000	520
	K-55	55,000	380	80,000	552	95,000	655
	C-75	75,000	520	90,000	620	95,000	655
	L-80	80,000	550	95,000	655	95,000	655
	N-80	80,000	550	110,000	760	100,000	690
C-95	95,000	655	110,000	760	105,000	725	
	P-110	110,000	760	140,000	965	125,000	860
Tubing 2 ^{3/8} inch to 4 inch (60.3 to 101.6mm OD)	H-40	40,000	275	-	-	60,000	415
	J-55	55,000	380	80,000	550	75,000	520
	C-75	75,000	520	90,000	550	95,000	655
	N-80	80,000	550	110,000	760	100,000	690
	L-80	80,000	550	95,000	655	95,000	655
P-105	105,000	725	135,000	930	120,000	830	
Drill Pipe 2 ^{3/8} inch to 5 ^{1/2} inch (60.3mm to 139.7mm OD)	E	75,000	520	105,000	725	100,000	690
	X	95,000	655	125,000	860	105,000	725
	G	105,000	725	135,000	930	115,000	790
	S	135,000	930	165,000	1140	145,000	1000

Note: For sour service, high collapse resistance, low temperature service or very high strength requirements, a range of heat treated specialty seamless pipes are available ex offshore seamless pipe mills





Casing and Tubing Service

As the world wide search for oil and gas leads to increased depth of wells and increasingly severe environments, seamless pipe mills across the world have developed stronger and heavier pipes to meet these challenges.

At this time, Orrcon manufactures E.R.W. O.C.T.G. to the A.P.I. grades STD5A: H-40, J-55 and STD5AC C-75 and L-80 in larger sizes. Orrcon is also able to offer internally coated casing and tubing, subject to minimum order quantities.

Specialised Casing And Tubing Service

Sour Oil and Gas service

Casing for this service is typically high strength seamless, simultaneously quenched and tempered with uniform microstructure, limited hardness and closely controlled yield (90-105,000 PSI). Resultant casing has superior resistance to hydrogen sulphide corrosion cracking, with high impact values at low temperatures.

CO₂ Service Casing and Tubing

Traditional carbon and low alloy steels are unsatisfactory in resisting corrosion caused by CO₂. To overcome this problem, some offshore suppliers offer high alloy chromium steels with CR9 and CR13 and various yield strengths to give high CO₂ corrosion resistance.

High Collapse Casing

Created as quench and tempered seamless with a subsequent hot straightening process, T95 and T110 grades have high yield, tensile and collapse values for specific deep well service.

Low Temperature Service

A range of alloy steels produced as seamless pipe, quenched and tempered, exhibiting high tensile strength as well as excellent ductility at low temperatures. Grades

available exhibit typical yield strengths in the range of 95-125,000 PSI.

High Strength Casing

Developed for very deep wells, these quenched and tempered seamless pipes have yield strength from 125-150,000 PSI and also exhibit higher tensile and collapse values.

ERW Casing and Tubing

Traditionally E.R.W. casing and tubing has been produced to A.P.I. STD 5A grades H-40 and J-55. As higher grade steels are developed for pipeline use there has been a subsequent increase in casing grades available, with these now including K-55, C-75 and L-80.

Colour Identification for Casing Grades

Grade	Colour Marking
H-40	Black
J-55	Green 'J' in Yellow
K-55	Green
C-75	Blue with C-1 or C-2 in white
N-80	Red
L-80	Red with brown band
C-95	Brown
P110	White

Sizes available Oil, Gas And Geological Drill Casing to meet J-55 Grade 55,000 PSI Minimum Yield

Outside Diameter MM	International Sizing Inch	Wall Thickness MM	Mass KG/M	Metres per Tonne
60.3	2 3/8 inch	4.2	5.81	172
		4.5	6.19	161
		4.8	6.57	152
		5.5	7.43	134
73.0	2 7/8 inch A.P.I.	4.2	7.13	140
		4.8	8.07	124
		5.5	9.16	109
88.9	3 1/2 inch	4.8	9.96	100
		5.5	11.3	88.4
		6.0	12.27	81.5
101.6	4 inch	4.8	11.5	87
		5.5	13.0	76.9
		6.0	14.15	70.6
114.3	4 1/2 inch	4.8	12.96	77.2
		5.5	14.76	68.2
		6.0	16.02	62.4
127.0	5 inch	4.8	14.47	69
		5.5	16.48	60.7
		6.4	19.3	51.8
139.7	5 1/2 inch	4.8	16.0	62.5
		5.5	18.2	54.9
		6.4	20.7	48.2
141.3	5 1/2 inch A.P.I.	4.8	16.16	61.9
		5.6	18.74	53.4
		6.4	21.29	46.9
152	6 inch	4.8	17.42	57.4
		5.5	19.87	50.3
		6.4	22.98	43.5
168.3	6 5/8 inch A.P.I.	4.8	19.36	51.6
		5.5	22.08	45.2
		6.4	25.55	39.1
177.8	7 inch	4.8	20.48	48.8
		6.4	27.06	36.9
		8.2	34.3	29.1
193.1	7 5/8 inch	6.4	29.47	33.9
		8.2	37.4	26.7
		9.3	42.16	23.7
219.1	8 5/8 inch	6.4	33.57	29.8
		8.2	42.65	23.4
		9.5	49.1	20.4
273.1	10 3/4 inch	6.4	42.09	23.8
		8.2	53.57	18.6
		9.3	60.5	16.5
323.9	12 inch	6.4	50.11	20.0
		8.2	63.85	15.6
		9.5	73.65	13.6

Notes:

Sizes 177.8mm OD and above are manufactured to A.P.I. 5L specification with internally scarfed weld bead.

Sizes 168.3mm OF and below are manufactured to either A.P.I. 5L or in accordance with AS1396 and may have either rolled or internally scarfed weld bead.

Larger diameters available subject to enquiry.

Standard stock lengths – 6 metres or 12 metres bevelled both ends.

141.3mm OD available in lieu of 139.7mm subject to enquiry.

Water Bore Casing Pipe Joining Options

Welded Pipe Joints

Apart from standard bevelled ends, Orrcon offers a range of welded joint options with its OrrBore casing pipe.

Welded Joints

For shallower or low pressure bores, lighter wall casing is typically used. This pipe is generally 6mm or less which precludes most threads as an option for joining.

The alternative welded joints may be butt welded as a smooth outer lined joint, or upsized on one end for a fillet style weld. Current options offered by Orrcon are:

OrrBore Expanded End Fillet Weld Joint

In response to industry requests, Orrcon has used its innovative skills to develop a low cost expanded end for water bore casing pipe. Available in diameters from 114.3mm OD to 610mm OD, the expanded end casing is produced in thicknesses of 4.8mm and 6.4mm. Other diameters and thicknesses are available subject to enquiry.

Designed to form a stronger and simpler welded joint than the traditional butt welded joint, the expanded end is formed with minimal stress and maintains close tolerances and shape. A full 120mm engagement of the male/female joint ensures ease of alignment with a minimum of pipe wastage. There is no reduction in pipe wall thickness where the end undergoes expansion.

Prominent features of this OrrBore Expanded joint are:

- Fillet Weld generally gives better joint strength than a straight Butt weld.
- Welding skills not as critical for Fillet Weld.
- Corrosion of weld area minimal compared with full Butt weld Joint.
- Expanded end allows clamping of lifting device to withdraw casing without need to weld on lifting lugs.
- Expanded end acts as centralising device to keep casing away from edge of bore hole.
- No thread issues, no damaged ends.
- Simple to align joint and maintain vertical bore.
- Low cost joint reducing installation times and joint failures.

Standard Bevelled End

An ex mill machine finished bevel to A.P.I. dimensions with 30 degree angle face and flat edge for butting two pipes together, allowing full fusion butt weld when pipes are assembled in the drill rig.

Prominent features of this joint are:

- Allows use of lighter wall pipes
- Low cost joint
- No thread issues
- Need good quality welding technique
- Has smooth outer profile for easier installation

Sizes available: all diameters and thicknesses in casing catalogue.

Welded Slip Joint

This is a welded joint developed to provide a smooth bore, and smooth external surface casing, primarily for percussion drilling where drillers prefer a welded joint, stronger in form than a straight full thickness butt welded joint. The joint requires no couplings or sleeves and is easily slipped together then welded insitu.

The joint is smooth faced, male/female ended and bevelled for optimum welding efficiency.

The prominent features of this casing joint are:

- No thread issues, damaged ends
- Simple to align joint
- Machined surface length of 80mm for all diameters
- Traverses through rocky ground easier than casing joined with couplings
- Needs good quality welding technique

Sizes available: Welded slip joint is available for all diameters from 101.6mm to 323mm OD. Sizes outside this range are available subject to enquiry.

Drill Casing Pipe Joining Options

Threaded And Coupled Joints

Where threaded joints are preferred, Orrcon offers the drilling industry the options of:

- a) supplying pre-threaded casing to the client's nominated thread specification – delivered to site OR
- b) supplying straight lengths of bevelled pipe to the client for their own threading.

Orrcon offers casing with a range of threads with types to A.P.I. STD 5B including eight round and buttress. At the time of printing Orrcon does not offer extremeline casing.

Some examples of the various threads available include:

Buttress Thread

Buttress Threads have a higher joint strength than A.P.I. 5B Round Threads and are thus used in deeper wells and for higher strength casing. Taper of the thread is 3/4 inch (20mm) per foot and the pitch is one fifth of an inch, the crest is truncated and the root is flat. The thread is free from the V notch effect and provides strength equal to that of the pipe. Stabbing the joint is simple and power tight joints are made with fewer turns.

Two Stage Threaded Flush Joint

This joint provides a smooth bore as well as a smooth external surface casing, free of protrusions and mis-alignment thereby avoiding interference when installing down hole equipment. No swelling or upsetting of pipe is carried out to increase wall thickness or diameter.

The joint consists of a shallow square thread at 4 threads per inch, with two separate thread landings. The lead-in of the thread is tapered to facilitate a smooth thread engagement and protects the thread edge against damage. The 4 thread per inch format is very resistant to cross threading and landing damage.

At the commencement of a joint, the location and alignment of the two pipes are achieved by crest landing contact, prior to any thread interaction occurring. Once threads are engaged, the joint only requires 5 complete turns to complete the joint, with only 32mm of original 85mm thread ends left for take up after initial joint insertion.

The flush joint casing replaces the traditional "slimline" casing and has a range of end use drilling applications.

The predominant features of this casing are:

- No cross threading
- Consistent self aligning
- Good stabbing
- Traverses through rocky ground easier than casing joined with couplings
- Threaded surface length of 85mm for all diameters
- Requires minimum wall thickness of 7.1mm

Two step flush seal joint casing is available for all diameters from 168.3mm and above. Sizes outside this range are available subject to enquiry.

For wall thicknesses less than 7.1mm, a straight 4 threads per inch thread can be supplied without the 2 stage features, down to 6.0mm wall thickness.





Ultraseal Threaded Joint

This joint is a recently developed threaded joint, bringing together various features on offer by other thread forms. The joint requires no socket coupling and provides a smooth bore as well as a smooth external surface casing. Free of protrusions and mis-alignment, the joint avoids interference when installing down hole equipment. No swelling or upsetting of the pipe occurs to increase wall thickness or diameter.

The Ultraseal joint has a range of end use drilling applications.

The predominant features of this casing are:

- No cross threading
- Traverses through rocky ground easier than casing joined with couplings
- Relatively low cost thread
- Thread is tapered for use on thin wall casing down to 6mm which is achieved through shorter thread length
- Consistent self aligning
- Threaded surface length of 50mm minimum for all diameters
- Not recommended for re-use when manufactured in 350 MPa material
- Casing can be recycled if manufactured in J55 or greater grades

Sizes available: The Ultraseal joint casing is available for all diameters above 114.3mm OD, provided that the wall thickness is 6.0mm minimum.

A.P.I. 8 Round Thread

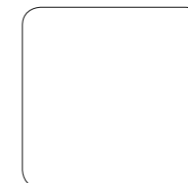
The joint is a traditional American Petroleum Institute (A.P.I.) threaded joint developed for casing and tubing joints in the oil and gas industry. They are tapered threads machined on the pipe and may be male/female ended, or male ends with a socket coupling connection. The taper of the thread is 3/4 inch per foot (20mm per 300mm) and threads may be "long" or "short" depending on the length of the threaded end, with a pitch of 1/8 inch (3mm) for pipe diameters. Smaller tubing diameters can have a pitch of 1/8 inch or 1/10 inch.

This thread form is normally supplied in J55 grade steel but 350 MPa is also available on request.

The main features of this joint are:

- Coupled joint is able to withstand higher pressures and be used for deeper drilling
- Thread may be used on all diameters down to 2 3/8 inch (60.3mm) tubing
- Can be used as a straight smooth casing without socket joint
- Widespread use of joint with couplings readily available
- Used mainly on oil field applications

Sizes available: From 2 3/8 inch (60.3mm OD) tubing upwards.





'Orrcon's stringent Quality Management System ensures that every pipe product we produce is manufactured, inspected and tested, to comply with the most exacting of requirements.'



H.W.T. 4 Inch Tapered – Coarse Flat Thread

This thread type has a broad 4 threads per inch straight sided flat thread. The thread is a series where the first numeral indicates the nominal pipe ID i.e. H = 4 inch P = 5 inch S = 6 inch.

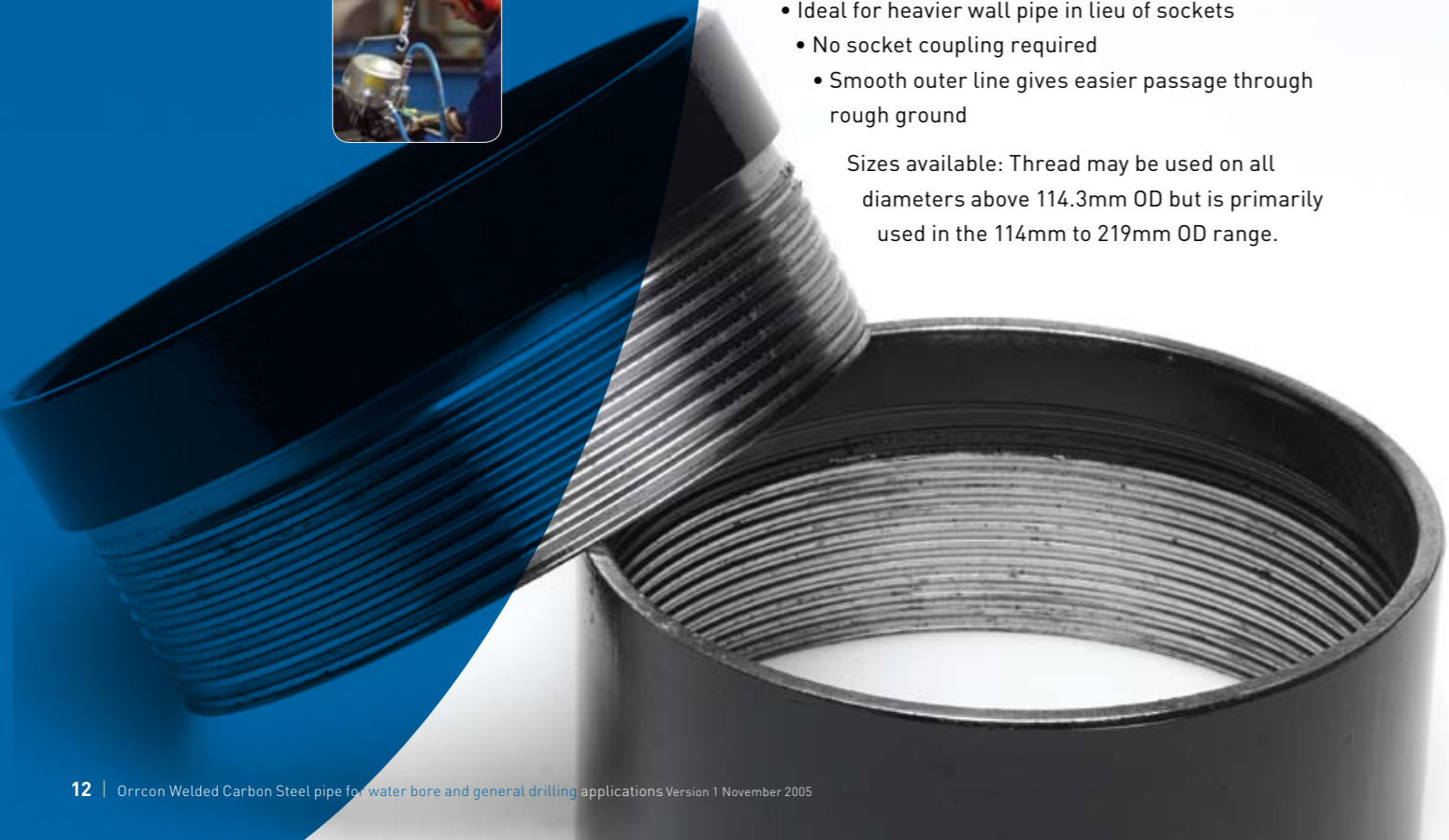
The thread may be straight or tapered, the later type indicated by "T" in the description.

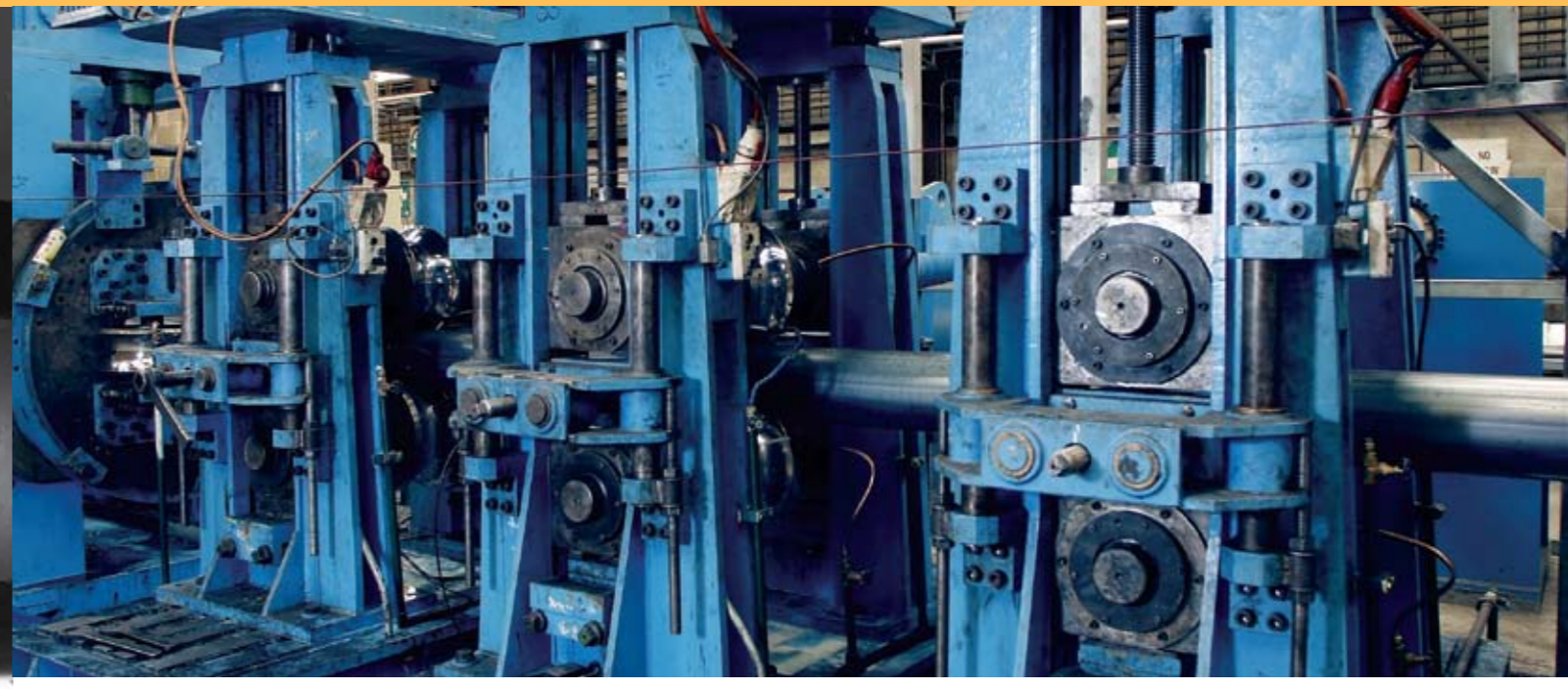
Due to the taper component of the thread, a minimum of 6.0mm wall thickness must be used on smaller diameters with heavier walls desirable on diameters 219mm and above.

The main features of this thread joint include:

- Less thread pick up than most threads
- Ideal for heavier wall pipe in lieu of sockets
- No socket coupling required
- Smooth outer line gives easier passage through rough ground

Sizes available: Thread may be used on all diameters above 114.3mm OD but is primarily used in the 114mm to 219mm OD range.





P.W. Coarse Thread In Left Or Right Hand Configuration

This thread is a 4 threads per inch flat thread with angled sides and is available in left or right hand threads.

The thread is used internationally for hammer drill operations and requires a minimum of 6.4mm wall thickness. The thread nomenclature is for coarse flat threads where H = 4 inch nominal ID, P = 5 inch ID, S = 6 inch ID

The most common use of this thread is as 5 inch ID or "P.W. Thread".

The main features of this thread joint include:

- Less thread pick up than most threads
- Both LHS and RHS threads available
- Ideal for heavier wall pipes
- No socket coupling required
- Ideal performance for hammer drill operation
- Used in unstable ground to avoid collapsing

Sizes available: Threads used on all diameters above 114.3mm OD and wall thicknesses 6.4mm and above.

Male And Female Steel Thread Protectors

A range of re-useable male and female thread protectors are available to protect casing threaded ends during long distance transportation. Thread protectors are available in most thread forms which can be returned to Orrcon for re-use on clients' future casing orders, thereby significantly reducing on-going operating costs.

Benefits of these thread protectors are:

- Mating steel protector offers maximum thread protection in transit
- After initial cost, re-use enables low cost thread protection

- Available in most thread forms
- Protects threads from rust and dirt build-up when stored in the field

Sizes available: All diameters of threaded pipe.

Polyurethane/PVC Thread Protectors

An alternative to steel re-useable protectors, are single use heavy duty plastic end caps. These caps offer a reasonable degree of thread protection against minor transit damage, with a common diameter cap being able to be used on most thread forms. Heavy duty threaded protectors are also available for increased protection of drill rods in both male and female ends.



Orrcon. An innovative and highly competitive supply option.

As one of Australia's leading manufacturers and distributors, Orrcon's ability to deliver international standard steel tube and pipe has injected new life into the Australian market by offering an innovative and importantly, competitive supply option.

With corporate offices in Brisbane facilitating a network spanning Australia & New Zealand, Orrcon is fast becoming the preferred supplier of quality steel, tube and pipe for Australian manufacturers and constructors.

Orrcon was established through the merger of two well-established Australian companies. Orrcon's acceptance has been nothing short of spectacular, with the company now holding strong market positions in both precision and structural tubing and forging ahead in the Oil & Gas Industry.

Orrcon Manufacturing

In Brisbane, Orrcon mills manufacture a comprehensive range of structural and precision pipe and tube products. A state of the art Electro-galvanising plant produces Orrcon's own 'ALLGAL' range of zinc protected tube.

In Adelaide, Orrcon operates four precision mills.

A newly commissioned ERW mill in Wollongong has commenced manufacturing large structural tube and API monogrammed oil, gas and water linepipe.

Orrcon Distribution

Strategically placed in Brisbane, Toowoomba, Sydney, Melbourne, Adelaide, and Perth, the Orrcon distribution network feeds an extensive spread of stockists in both metropolitan and rural Australian markets.

The establishment of warehousing facilities in Auckland, New Zealand has underpinned Orrcon's major export market. Future growth sees exports to the USA, Canada, and Papua New Guinea.

Orrcon Quality

Orrcon's stringent Quality Management System ensures that every pipe product we produce is manufactured, inspected and tested, to comply with the most exacting of requirements.

Like we say... 'Australian made to international standards'.



Welded Carbon Steel Pipe

FOR WATER BORE AND GENERAL DRILLING APPLICATIONS

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